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received by our Admiralty, there is a prospect of submarine torpedo boats, becoming an important factor in the future strategy of marine warfare. Apart from the ancient history of diving or submarine torpedo boats, the recent activity, notably of the French and American naval authorities, and the favorable views with which the experts of these two nations look upon the latest developments in submarine torpedo boats, is more than ample justification for our Admiralty giving serious consideration to this most dangerous and constantly improving mode of torpedo attack. Our battle-ships are estimated to be worth £40,000,000 and our protected cruisers about £26,000,000, whilst other fighting ships of our Navy are valued at about £34,000,000, making in all a grand total of £100,000,000. Surely if our costly Navy is to be menaced with such a system of deadly torpedo attacks as may reasonably be anticipated from the modern submarine boats of foreign naval Powers, it behooves our Government to test and adopt counteracting means of attack, and also to endeavor to secure some more reliable means of defence against such attacks than at present obtain in our Navy."

THE last year was the 'record year' for Great Britain as well as for the United States. That country registered a foreign trade totaling about four thousand dollars. The imports were £485,000,000, of £12 per capita of total population, the exports £264,000,000, about £6 // 11s, per capita and the re-exports £65, averaging £1 // 12s. There has never been a year in which so much trade was reported, so much manufacturing done or so much profit secured; notwithstanding the enormous amount of successful competition in the British market and the markets of the world, to which the United States and Germany have attained. Prosperity has been quite extraordinary in all manufacturing and exporting countries.

R. H. T.

BOTANICAL NOTES.

BOTANY AT WOODS HOLL.

FOR about a dozen years opportunities for botanical study have been offered to botanists at the Marine Biological Laboratory at Woods Holl, a seaside town on the southern coast of

Massachusetts. Year by year the work offered has been enlarged, so that now, under the direction of Dr. B. M. Davis, of the University of Chicago, it includes a laboratory study of algæ, fungi, plant physiology, plant cytology and micro-technique, with lectures covering nearly the whole field of botany. The laboratories are open from July 5th to August 16th.

When we think of the poor preparation of so many of our teachers of botany in the high schools, and even the colleges and the so-called universities, it is strange that more of them do not take advantage of the opportunities offered by such a school as this at Woods Holl. It is encouraging to see that already eighteen colleges are coöperating in supporting this laboratory school. There should be many more of these. Every large institution should offer as a prize to its advanced men a room or table in the Woods Holl Laboratory. In many cases this would be of much more value to the recipient than a scholarship or fellowship costing the institution much more money. These might be called 'Woods Holl Scholarships,' the recipient to spend the season in work in the laboratory, and to bring back into his college at the end of the summer vacation the results of his studies.

MINNESOTA BOTANICAL STUDIES.

THE thick 'part' of this interesting and unique publication which appeared early in January, contains articles on *Chlorochytrium* (an endophytic alga of the Protococcaceae, found in the thallus of a marine seaweed), *Rhodymenia* (a red seaweed from the Pacific Coast), the Lichens of the Lake Superior Region (enumerating one hundred and fifty-eight species and varieties, forty-six of which had not hitherto been recorded from the interior flora of the United States), Lichens of the Minnesota Valley (enumerating two hundred and one species and varieties of which forty-one had not hitherto been recorded from Minnesota, one being new to science), Synonymic Conspectus of Native and Garden Aquilegias of North America (describing forty-six species and varieties), Synonymic Conspectus of the Native and Garden Aconitums of North America (describing seventeen species and varieties).

HARPER'S STUDIES IN CELL DIVISION.

THE December number of the *Annals of Botany* contains another of those valuable contributions to plant cytology which have appeared from time to time from the hand of Professor Harper. He takes up in the present paper the cell-division in sporangia and asci, using for the former mainly the species of *Saprolegnia* and *Achlya*, with some of the *Mucoraceae* and *Synchytriaceae*, also. For the cell-division of asci he has made use of his previous studies in the *Erysipheae*, and now adds *Lachnea scutellata* of the *Pezizaceae*. His summary of results is in part as follows:

"If we compare now the methods of spore-formation in the ascus and in the sporangia studied, the differences in the two cases are at once apparent. In the ascus, as in the higher plants, the cutting out of the daughter cell from the mother cell is effected by the agency of the same fibrous kinoplasmic elements as were concerned in the division of the nucleus. In the higher plants the flat cell-plate is formed by the 'cone-principal' of the karyokinetic figure as named by Van Beneden, while in the ascus the daughter cell is cut out of the protoplasm of the mother cell by an ellipsoidal cell plate formed from the fibers of the antipodal cone. In this process the daughter cell is cut out of the interior of the protoplasm of the mother cell, so that it remains surrounded on all sides by the material of the mother cell. The daughter cells do not contain all the protoplasm of the mother cell, a considerable mass remaining as the so-called epiplasm. This is typical free cell-formation, as I have pointed out before. In all the sporangia studied, the cleavage is from the surface of the protoplasm, or from the surface of vacuoles of the mother cell. The daughter cells are thus separated by cleavage-furrows, and the nature of the division from the surface inwards precludes the possibility of the formation of an epiplasm. * * *

"If we consider now the bearing of the observations presented, on the doctrine that the ascus is a more highly developed and specialized modification of the sporangium of the Zygomycetes, it is plain that the very different methods of cleavage in the two cases are opposed to the assumption of any close relation-

ship between them. In fact, it seems rather difficult to imagine any intermediate stages which could connect the process of cleavage by surface-furrows, as seen in the sporangium, with the free cell-formation of the ascus. * * *

"The total dissimilarity of the process of cleavage in the sporangia described and the ascus as I have shown it in the above account, makes it necessary to look for the ancestors of the Ascomycetes elsewhere than in the lower Fungi. Thaxter's studies of the Laboulbeniaceae have emphasized greatly the resemblance of that group to the Florideae and the hypothesis of the multiple origin of the Fungi from the Algae has gained correspondingly in strength. * * *

"We can say, however, as noted above, that the unlikeness in the method of spore-formation in the ascus and the sporangia which I have studied, makes it impossible to assume any very direct relationship between the Phycomycetes and Ascomycetes."

SHORT NOTES.

COULTER and Rose contribute an important paper to the Proceedings of the Washington Academy of Sciences, consisting of a synopsis of Mexican and Central America Umbelliferae, in which all the data with respect to the umbelliferous flora of the region under consideration are brought together. Thirty-nine genera and one hundred and eighty-two species are enumerated.

AN interesting paper by O. Borge of Stockholm, on the fresh-water algae of Franz-Josefs-Land (*Süsswasseralgen von Franz-Josefs-Land*, Königl. Vetens. Akad. Förhandl, 1899) enumerates the plants collected by the Jackson-Harmsworth Expedition. No less than forty-three species, representing twenty-two genera, are enumerated. These genera range from *Oscillatoria*, *Nostoc*, etc., to *Cosmarium*, *Spirogyra*, *Vaucheria* and *Oedogonium*. One new species is described, namely, *Monostroma fisheri*, of which, oddly enough, a variety, also (var. *minor*) was found.

C. G. LLOYD continues his 'Mycological Notes' (No. 4, November, 1899) and takes up the genus *Psalliotia*, describing six species and varieties, and enumerating eighteen or twenty

others which have been recorded as occurring in this country. Some of the latter are rare, some of doubtful occurrence, while others are based on erroneous determinations.

THE report of the Botanist of the United States Department of Agriculture, recently issued, gives one some idea of the many kinds of work taken up by that division, including poisonous plants, seed testing, seed and plant introduction, economic plants of the tropics, etc.

BOTANISTS may obtain a suggestion as to how to secure the publication of some of the matters they wish to distribute to the people, from a tiny pamphlet on the 'Stinking Smut of Wheat,' by Professor Bolley, of the North Dakota Agricultural College, which was 'published for the farmers of Minnesota and North Dakota' by one of the enterprising railway lines. It is popularly written, and at the same time is scientifically reliable.

RECENT 'Contributions to the Flora of Queensland' by F. M. Bailey, Colonial Botanist, enumerate and describe many new plants, and call attention to certain plants 'reputed to be poisonous to stock.'

A RECENT report on the 'Timber Trees of the Herberton District of North Queensland,' by J. F. Bailey, assistant to the Colonial Botanist, is interesting to American botanists on account of the fact that but one of the genera enumerated (*Zanthoxylon*) is native to this country. One obtains little idea of the appearance of the Queensland forests from an examination of the descriptive list of one hundred and eleven names. What notion, for example, does one have of species of *Acronychia* and *Halfordia* (Rutaceae), or *Blepharocarya*, *Euroschinus* and *Pleiogynium* (Anacardiaceae), or *Aleurites*, *Balgolia* and *Mallotus* (Euphorbiaceae)?

THE successive numbers of the *Forester*, 'a monthly magazine devoted to the care and use of forests and forest trees and to related subjects' contain so much that is botanical, and are so beautifully illustrated that we cannot do otherwise than commend it to botanists as a most helpful journal.

CHARLES E. BESSEY.

THE UNIVERSITY OF NEBRASKA.

SCIENTIFIC NOTES AND NEWS.

SIR MICHAEL FOSTER has been returned to Parliament as representative of the University of London. The final vote was: Sir Michael Foster, 1271; Dr. Collins, 863; Dr. Busk, 586.

THE Paris Academy of Sciences has elected as a corresponding member, Dr. H. G. Zeuthen, professor of mathematics at the University of Copenhagen.

PROFESSOR C. BARUS, of Brown University, has been asked by the committee in charge to present a report on pyrometry at the International Congress of Physicists of the Paris Exposition.

PROFESSOR IRA REMSEN, of Johns Hopkins University, will deliver the address at the dedication of the new chemistry building of the University of Kansas next fall.

THE following named botanists and zoologists have recently joined the Washington Academy of Sciences as non-resident members: C. E. Bessey, University of Nebraska; John M. Coulter, University of Chicago; G. L. Goodale, Harvard University; C. S. Sargent, Arnold Arboretum; W. P. Wilson, Philadelphia Commercial Museums; W. B. Scott, Princeton University; Henry F. Osborn, Columbia University; David S. Jordan, Stanford University; William Brewster, Cambridge, Mass.; J. A. Allen, American Museum of Natural History; E. A. Andrews, Johns Hopkins University; H. C. Bumpus, Brown University; Carl H. Eigenmann, Indiana University; Walter Faxon, Harvard University; Chas. H. Fernald, Mass. Agricultural College, S. A. Forbes, University of Illinois; Simon H. Gage, Cornell University; Samuel Garman, Museum of Comparative Zoology, Cambridge; Alpheus Hyatt, Boston Society of Natural History; C. C. Nutting, State University of Iowa; Arnold E. Ortmann, Princeton University; W. E. Ritter, University of California; R. E. C. Stearns, Los Angeles, California; R. P. Whitfield, American Museum of Natural History; Edmund B. Wilson, Columbia University.

As we have already announced, Professor R. W. Wood, of the University of Wisconsin, is at present in England, having been invited by the Society of Arts to lecture on 'The Method of